G08.15

Detection of Surface Structure and Appearance of Injection Molded Parts.

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Surface defects such as sink marks, gloss and color differences still form a big problem in injection molding of decorative parts. Since in most cases more or less trained evaluators decide by visual observation or by using comparison kits about the acceptance of a part, there is still a strong human component in decision. Lots of effort to quantify the surface appearance has been made so far. Both surface roughness parameters as well as gloss and gonio-reflectometer parameters cannot completely evaluate what human eye-apparatus exactly perceives. In addition to that rough surface structures are often used to conceal surface defects, so that the human eye cannot detect the surface defects anymore. Using recently developed and patent-pending series of methodologies [1,2], utilizing multi-dimensional data acquisition and mathematical modeling to evaluate surface appearance in a quantitative, reproducible and unambiguous way, different steel and corresponding plastics part surfaces were analyzed. Surface structures such as mirror-finished surfaces with range peel, etched and electro-discharge-machined surfaces were characterized unambiguously and reproduced on plastics parts using the surface reproduction injection mold [3]. Consequently, global surface defects on plastics parts e.g. moisture streaks, colored streaks and gloss differences were characterized. The surface appearance is well defined by characterization methodologies developed by D.P. Gruber et al.

[1] D.P. Gruber, M. Buder-Stroissnigg and G. Wallner, Verfahren zur Analyse der Oberflacheaneigenschaften eines Materials, patent, A1036 (2005)
[2] D.P. Gruber and G.R. Berger, Quantitative characterization of plastics surface appearance aspects in accordance with the human perception, Proc. Conf. 22nd Annual Meeting of the Polymer Processing Society, Yamagata (2006)
[3] G.R. Berger, W. Friesenbichler, G.R. Langecker and H.M. Hoedl, Characterization of surface reproduction in injection molding process, Proc. Conf. 21st Annual Meeting of the Polymer Processing Society, Leipzig, SL 2.9 (2005)